Convention at London in 1885 of a million sterling to be devoted to irrigation was the first step towards the regeneration of Egypt, which has since gone on with scarcely a check on the lines which he then laid down. Those first six or seven years were years of rigid economy, when all expenditure had to be strictly curtailed and every source of revenue carefully husbanded, but by 1890 the race against bankruptcy was won, and it became possible to deal more generously with various branches of the Administration.

Lord Cromer was always keenly sympathetic towards education, and year by year as means became more ample the grants for it were increased. Schools for elementary vernacular education and secondary and technical schools were established in constantly increasing numbers throughout the country, while the training of teachers to staff them was likewise taken in hand. In a Mohammedan country the education of the female population always presents especial difficulties, but an ever-increasing number of girls' schools have gradually been established throughout Egypt.

Efficient irrigation of the cultivable land being the prime necessity of Egypt's existence, the first grant which made the restoration of the Delta Barrage practicable was followed by many others, and Lord Cromer supported unceasingly the demands of the irrigation engineers until the present system of dams, barrages, and distributing canals had been, if not completed, at least largely achieved. Closely related to irrigation is the agriculture of the country, and the investigations necessary to improve the principal crops had always his warm support.

"The principal function of Government," said Lord Cromer in his report for the year 1903, "is the prevention of epidemic diseases," and to provide adequately for the sanitation of the country was increasingly his care as resources became greater. Recent visitations of cholera and bubonic plague have shown how much success has been obtained in this direction; while the hospitals and medical schools which now exist have made many forget the appalling conditions which prevailed in that country forty years ago.

The geological survey and the cadastral survey of Egypt, from which developed the recent geodetic work in the Nile Valley, are further instances of the way in which Lord Cromer encouraged the more scientific aspects of work of practical importance.

In Egypt archæology has a vast and important field of activity, and while his own interests were most closely connected with the classical period, Lord Cromer supported all projects for the better conservation of ancient buildings and the investigation of the past history and the ancient civilisation of the country. To his advocacy we owe the systematic study of the Nile Valley in Nubia, which, besides the archæological results, has yielded in the hands of Prof. Elliot Smith such important evidence relating to the Egyptian race.

After his retirement from Egypt his interest in science led him, by becoming president of the Research Defence Society, to aid the opposition to the ignorant outcry against vivisection, since he recognised its importance in furthering the advancement of medicine and surgery. In 1911 he was elected a fellow of the Royal Society as one who had rendered service to science.

Laden with heavy responsibilities of administration, and fully occupied by the many problems which Egypt presented, he still found time to take interest in all new investigations which were being undertaken; his kindly advice and powerful aid were always available to those who were playing their part in the reconstruction of Egypt, and to them he was one on whose support they could always confidently depend. H. G. L.

NOTES.

AMONG the list of honours conferred by the King on officers of the Army, the Royal Army Medical Service has reason to be gratified by the number bestowed upon its members. Sir Alfred Keogh, the Director-General, is promoted to be G.C.B., sharing this distinction with Sir William Robertson. Sir Alfred Keogh was a former Director-General of the Army Medical Service, and subsequent to his retirement became rector of the Imperial College of Science and Technology, but soon after the outbreak of war was recalled to his former post. He found the Royal Army Medical Service confronted with a task of the first magnitude, and its staff numerically wholly inadequate to cope with the work before it. Within a few months he made a new force of it; numbers of the younger medical practitioners were enrolled in its ranks, and senior members of the medical profession—physicians, surgeons, hygienists, and specialists in all branches—were attached to it in a consultative capacity. For two years this virtually new force has worked harmoniously and efficiently. Never before have the wounded been so promptly and so adequately cared for, while the prevention of the numerous diseases which are so liable to follow on war and the train of an army has never been more successfully accomplished.

THE KING has been pleased to confer the Companionship of the Order of the Bath, for services rendered in connection with the war, upon Lieut.-Col. G. H. Barling, vice-chancellor of the University of Birmingham, who is now serving as a consulting surgeon to the British Army in France. The honour of Companionship of the Order of St. Michael and St. George has also been conferred for war services upon Major Bertram Hopkinson, F.R.S., professor of mechanism and applied mechanics, Cambridge University.

WE regret to see in the *Morning Post* of January 30 the announcement of the death, at eighty-two years of age, of Mr. John Tebbutt, of Windsor, New South Wales, where he had an observatory and carried on very valuable astronomical work for many years.

SURGEON-GENL. SIR G. H. MAKINS will deliver the Hunterian oration before the Royal College of Surgeons of England on Wednesday, February 14. The subject will be the influence exerted by the military experience of John Hunter on himself and on the military surgeon of to-day.

It is announced in the *Times* of January 29 that summer time will be reintroduced in Germany and Austria-Hungary on April 1, and will last until the end of September. Apparently, therefore, the reported rejection of the proposal by a committee of the Prussian Diet, referred to last week (p. 414), was either incorrect or will be disregarded.

We note with regret that the *Engineer* for January 26 records the death of Mr. James Stirling at the age of eighty-one years. Mr. Stirling was locomotive engineer to the South-Eastern Railway from 1878 to 1898, and introduced many improvements, including the steam reversing gear. He was a member of the Institution of Civil Engineers and also of the Institution of Mechanical Engineers.

The President of the Board of Agriculture and Fisheries has appointed a committee of representative agriculturists to advise him on questions arising in connection with the increased production of food. The committee is constituted as follows:—The Right Hon. R. E. Prothero (chairman), the Right Hon. Sir Ailwyn E. Fellowes (vice-chairman), the Right Hon. F. D. Acland, the Right Hon. Henry Hobhouse, the Hon. Edward G. Strutt, Sir Sydney Olivier (Board of Agriculture), Mr. W. W. Berry (Development Commissioner), Mr. S. W. Farmer, Mr. F. L. C. Floud (Board of Agriculture), Mr. A. D. Hall (Development Commissioner), Mr. S. Kidner, Mr. T. H. Middleton (Board of Agriculture), Mr. A. Moscrop, Mr. H. Padwick (National Farmers' Union), Mr. R. G. Paterson, Mr. G. G. Rea, Mr. E. Savill, Mr. Leslie Scott, and Prof. W. Somerville. Mr. E. M. Konstam (who has joined the department for the duration of the war) is the secretary of the committee.

According to a telegram (*Daily Mail*, January 26) Dr. T. B. Robertson, professor of biochemistry in the University of California, has succeeded in isolating from an extract of the pituitary gland a substance which has the power to influence and regulate the growth of the body. That the secretion of the pituitary gland does take a part in regulating the growth of the body has been known since 1886, when that remarkable growth disturbance which Marie named acromegaly was discovered to be directly related to a diseased condition of the pituitary gland. In 1895 Oliver and Schäfer surprised medical men by isolating from the pituitary gland a substance which has a powerful influence on unstriped muscle fibres and on the walls of blood-vessels. The effects produced by extracts from the pituitary gland are so complex and diverse that it is highly probable it may produce several different substances which act as hormones on the tissues of the body. Hitherto the element which acts as a growth-sensitiser or regulator has not been identified.

A number of influential persons interested in the development of the resources of the Empire have formed themselves into a committee, of which Sir Starr Jameson is for the present acting as chairman, Mr. Almeric Paget, M.P., as honorary treasurer, and Mr. Wilson Fox as honorary secretary. The committee, which represents every party in the State, has for its ultimate object the appointment of a board to develop the Empire's resources; but in the meantime it has been inquiring into various questions in order to present a *prima facie* case for the consideration of the Government. The committee has the following purposes:—(1) To advocate (*a*) the conservation for the benefit of the Empire of such natural resources as are, or may come, under the ownership or control of the Imperial, Dominion, or Indian Governments; (*b*) the development of selected resources of the Empire under such conditions as will give to the State an adequate share of the proceeds; (*c*) the appointment in due time of a Board for the Conservation and Development of the Resources of the Empire, so that Imperial effort may be concentrated on assets ripe for development for the common good of the Empire. (2) To take such action as may from time to time appear to be desirable in order to disseminate information in regard to the objects of the committee, to arouse and maintain public interest, to enlist public sympathy and support, and to co-operate with other committees and associations having similar objects.

Dr. H. R. Mill, director of the British Rainfall Organisation, contributes a special article to the *Times* of January 25 on the rainfall of 1916. Detailed results are given for 131 stations. Last year is shown to have been generally a wet year; the rainfall was far in excess of the average at most stations, and slightly below it at only a few. A map shows the distribution of rainfall, and forestalls the fuller results, from about 5000 stations, which will appear later in "British Rainfall, 1916." A deficiency of rainfall for 1916 is shown in the extreme south-west of Wales and the north-west of Devon and Cornwall, and in two areas in the centre of England, one stretching east and south from the north of Anglesey and the estuary of the Mersey, the other in the south-east of Yorkshire. The area over which the year was relatively dry was much less than in any other of the last twelve years, except perhaps 1912. The excess of rain was most pronounced in the south of England, the centre of Scotland, and the south-west, north-west, and east of Ireland. The wettest part of England was in the district of East Grinstead, where the excess was about 40 per cent. In Scotland the excess of rainfall was 20 per cent. over nearly one-half of the country, while in parts there was an excess of more than 40 per cent. The whole of Ireland was wet; the greatest excess of more than 30 per cent. stretched inland from Dublin Bay. No year since 1903 has been wetter than last year in Scotland and Ireland, while the British Isles as a whole have only been wetter than 1916, during the last fifty years, in 1903, 1882, 1877, and 1872. In London the total measurement for the year was 34·01 in., which is 35 per cent. above the average for fifty years. In 1903, the wettest year on record, the rainfall was 38·10 in., and the only other year since 1858 with as much rain as 1916 was 1878, with 34·08 in.

Mr. A. W. Cardinall, in the January issue of *Man*, describes a collection of stone implements from Ashanti. Most of them are of normal types, but one specimen is peculiar from its remarkable size—14·5 cm. in length, and maximum breadth 5·5 cm. In its coarse flaking it resembles specimens collected by M. Xavier Stainer from the Congo, but in the Ashanti weapon its rounded cutting edge is perfectly distinct, and there is no doubt that this has been produced by grinding.

We have received the list of seeds of hardy herbaceous plants, trees, and shrubs available for exchange from the Royal Botanic Gardens, Kew, forming Appendix I. of the Kew Bulletin for 1917. We are glad to notice that the list is a full one, and shows that this important side of the work of a botanic garden has been fully maintained during the past year, despite the large number of men who are absent on military duties.

Wart disease of potatoes, which has caused such serious loss in the north of England, is difficult to eradicate from a district owing to the length of time the soil may remain infected with the fungus, *Synchytrium endobioticum,* which is its cause. Owing to the thick coats which cover the sporangia no method of killing them has been discovered, so that soil treatment as a remedy is of no practical use. Experiments recently carried out at the pathological laboratory of the Royal Botanic Gardens, Kew, by Mr. A. D. Cotton (see Kew Bulletin, 1916, No. 10) have proved that, in addition to the potato, our common English weeds, *Solanum nigrum* and *S. dulcamara,* can be infected with wart disease, and a few small warts containing the characteristic sporangia of the fungus have been produced on the roots of these two plants. Though these plants may not be active sources of soil infection, it is clear that they should be removed from a wart-disease area.

In reference to our recent note (Nature, vol. xcviii., p. 395) as to the replacement of materials in sedimentary rocks by iron pyrites, Mr. C. Carus-Wilson writes that he has described a case from the base of the Cainozoic strata in Bournemouth Bay, where a lignitic vegetable mud in the interstices of a sandstone has been thus changed into a pyritic cement.

A handsome addition has been made to the representation of regional geology by the publication of a colour-printed geological map of Mysore on the scale of 1 in. to 8 miles (approximately 1 : 500,000). The whole of the rocks are assigned to the Archæan era, with the exception of the "sheet laterite" of the north, which is probably in the main of Cainozoic age. The map, compiled under Dr. Smeeth's direction by the Department of Mines and Geology of Mysore, gives a clear and harmonious picture of the great folded masses of crystalline rocks, striking N.N.W. from southern India, until they are concealed by the enormous Cretaceous lava-flows of the Bombay Presidency and Haidrabad. Dr. Smeeth's general description of the country was noticed in Nature, vol. xcvii., p. 505.

Naturen for October, 1916, contains an appreciative review of the geological work of Prof. Amund Helland, of the University of Christiania, written by Hr. P. A. Øyen in connection with the seventieth birthday of this veteran observer. An attractive portrait accompanies the memoir. The author usefully reminds us that Helland stands as one of the great pioneers in glacial studies, and that before he was thirty years of age he undertook a journey to Greenland in order to satisfy himself of Ramsay's views on the relation of fjords and cirques to ice-action. This notice makes us turn with pleasure to Helland's paper published in the Quarterly Journal of the Geological Society of London in 1877 (vol. xxxiii.), where the origin of cirques in alternations of frost and thaw, combined with the presence of a transporting glacier, is very clearly stated. Hr. Øyen remarks that even the famous discussion on glacial erosion in Stockholm in 1910 added little to what had been put forward many years before by Ramsay, Lorange, and Helland.

The Weekly Bulletin of the Hawaiian Volcano Observatory is in reality a monthly paper of some twelve pages, and is supplied to the members of the Hawaiian Volcano Research Association. Movements and changes in the Kilauea crater are reported under weekly headings, and, beginning with the bulletin for August, 1916, photographic plates of the surface of the lava-lake of Halemaumau are issued by Mr. T. A. Jaggar, jun., so as to form a continuous record. The importance of such observations lies in the fact that the stages leading up to a disturbance of unusual magnitude cannot be missed, as is commonly the case where active volcanoes attract spasmodic attention. The Hawaiian Observatory may aid in explaining the circular plugs of lava, with radial structure, described as "craterlets" in the Deccan Trap (L. L. Fermor and C. S. Fox, Records Geol. Surv. India, vol. xlvii., p. 81, 1916). These occur in a limited region of the Chhindwara district of the Central Provinces, and are now well illustrated, so that we may hope for their recognition elsewhere as the basal portions of spiracles and lava-bubbles.

The difficulty in the spelling and transliteration of place-names arises out of the insufficient number of characters for separate sounds which our alphabet contains. This has been partly overcome by geographical authorities in different countries using an alphabet devised for the purpose, but all present difficulties in the way of phonetic representation. In the Memorial volume of the Transcontinental excursion of 1912 of the American Geographical Society, Mr. G. G. Chisholm suggests an international alphabet as a standard of reference. By comparison with this alphabet geographical authorities of different countries might decide the signs to be used for particular sounds in their own alphabet. Mr. Chisholm would like the sounds of this alphabet recorded on gramophone records, a copy of which could be kept by every important geographical society.

In the *Geographical Review* for December (vol. ii., No. 6) some account is given of the new Museum of the American Indian, the foundation-stone of which was laid in New York in November, 1915. The museum, which will occupy part of the same block as the American Geographical Society, is the outcome of the collections of Mr. George G. Heye, and will contain everything of value to the student of the American Indian, from Fuegia to the Arctic regions. Up to the present all the funds for the furtherance of the work, including many expeditions, publications, and the purchase of collections, have been furnished by Mr. Heye and his mother. Mr. Heye has now turned over all his collections to a board of trustees, of which he has been elected chairman. Mr. Heye retains the directorship. The new building will probably be completed in the spring.

Electrostatic methods have sometimes been tried with doubtful success for separating minerals of nearly the same specific gravity. Writing in the *Rendiconti del R. Istituto Lombardo* (xlix., 15), Dr. Pietro Riboni now proposes a new arrangement consisting of a horizontal plane conductor at zero potential, and a cylindrical charged conductor fixed above it with its axis parallel to the plane. The conducting particles fly to and fro between the two conductors, becoming alternatively positively and negatively charged, and owing to the curvature of the lines of force which are arcs of circles, coupled with the effects of gravity and possibly elasticity, they gradually make their way outwards. The dielectric particles, on the other hand, tend to travel towards the places where the intensity of the field is greatest, and are found in the centre of the field. Although this method is described mainly with a view to the separation of metallic particles, it might be interesting to try whether it could be used to eliminate coal-dust from shore gatherings of foraminifera.

The proximity to the field of Italian military operations of portions of the remarkable formation known as the Karst adds interest to a paper in *Scientia* (xx., 8), by Luigi De Marchi, on "The Waters of the Carso" (in Italian, with French translation by Dr. S. Jankelevitch). The tableland between Trieste and Abbazia is simply honeycombed with craters, some no larger than a room, some hundreds of yards in diameter, the hollows of which are cultivated with potatoes, while at Abbazia springs of cold fresh water come welling out from beneath the sea and from rocks on the shore in most of the bathing-places and elsewhere. Some difference of opinion exists as to the condition of the underground waters in such districts, in particular as to the existence of subterranean basins filled with water up to a certain level as distinct from underground rivers, and Dr. De Marchi discusses Grund's views in this connection. There is in southern Italy another Karst region in the arid portions of Puglia, but in this case the fissures are much smaller, and the author here finds conditions under which the bed of water is not much above the sea-level.

MR. A. GRANGER, the chief inspector of weights and measures for Birmingham, has written a pamphlet entitled "Our Weights and Measures" (published by Messrs. Eyre and Spottiswoode, price 6*d.*), suggesting certain modifications of the imperial system of weights and measures with a view to its simplification. He appears to be of opinion that such a radical change as the displacement of our weights and measures by the metric system is not practicable, and his plan is to modify the present system so as to make it as convenient and rational as possible. His proposal involves the introduction of a new pound weight equal to half a kilogram, which for all ordinary purposes means an increase of the present pound by 10 per cent., and a new gallon, also 10 per cent. greater than the present one, practically equivalent to 5 litres, or ½ dekalitre. This would not disturb the plan of the imperial system; for example, the legal definition of the gallon as containing ten imperial pounds of distilled water would still hold good. His idea is ingenious, but it seems probable that if any change is effected in our weights and measures it will be in the direction of adopting the metric system in its entirety, rather than modifying the present imperial units.

THE investigation which M. Guillaume, of the Bureau International des Poids et Mesures, Paris, has been conducting into the changes undergone by steels used as length standards has shown results of interest to engineers and scientific workers (*La Nature*, January 6). Briefly summarised, his conclusions are as follows:—The most important point in connection with the use of steels in the tempered state for the preparation of standards of length is that of the "stabilisation" of the steel. It may be said generally that between 0° and 100° C. the transitory variation in length (like that in glass or in the nickel-steels) is proportional to the square of the temperature. With stoving carried to a high limit of duration, the total variation between 0° and 100° C. is about 5 microns. At ordinary temperatures this variation is only of the order of a small fraction of a micron per metre length. For tempered steels stoved for only a short time, the transitory variation is much greater. To conclude: as regards tempered carbon-steels, the variations of all kinds before stoving are appreciable and rapid, but can be so minimised as to cease to be prejudicial to the use of such steels for industrial end standards.

THE *Times Engineering Supplement* for January 26 is the annual review number, and contains much interesting matter relating to the progress of engineering in 1916. Experience has accumulated during the past year regarding the features of ship-construction which are calculated to enable a ship to remain afloat after torpedo or gunfire attack. Longitudinal subdivision, while practicable in warships at great cost, is impracticable in an ordinary cargo vessel, and it is considered doubtful whether transverse water-tight subdivision would enable a cargo ship to resist torpedo attack. While merchant vessels can be greatly improved to protect them from torpedo attack, considerations of design, economy of construction, and carrying and earning power make it preferable to arm the ship. This is the course which will probably be adopted in the new tonnage now building. In America, owing to the enormous demands on the steel industry, it has been found impossible to keep abreast with the demand for shipbuilding material. This has led to a revival of wooden shipbuilding, and a number of wooden hulls are now being constructed in the Seattle district and at various points on the Pacific Coast.

THE *South African Journal of Science* for October, 1916, contains a report of the address to Section B (Chemistry, Geology, Metallurgy, Mineralogy, and Geography) of the South African Association for the Advancement of Science by the president of the section, Prof. J. A. Wilkinson. The address deals with two general questions: first, the organisation of the South African Union for the fuller development of its industries and resources, and, secondly, the necessity of research in order to develop existing industries and establish new ones. Dealing with the first question, Prof. Wilkinson points out that hitherto South Africa has existed on its raw materials, which are exported whilst articles manufactured from them are imported He gives a long list of imported articles, the most important being coal products, earthenware, glass, cement, condensed milk, paper, sugar products, oils, fats, and waxes, and medicinal preparations which could be manufactured from the natural resources of the colony. Some of these are, in fact, manufactured there, but the quality is not so good as that of the imported articles, and this is stated to be due to the lack of effective chemical control in the industries. It is urged that South Africa is not sufficiently self-contained, and that the necessity of establishing chemical industries with *chemists*, not merely engineers and business men, in control is vital. With regard to the second question, the position of the tannin bark industry of Natal now (tannin was synthesised by E. Fischer and K. Freudenberg in 1913) is compared with that of the natural indigo industry in 1880, when indigo had been synthesised in the laboratory, but the long period of development which made it a commercial success was only beginning. It is argued that had as much time and money been spent on the scientific investigation of natural indigo as were spent on the synthetic dye, the vegetable product would have been placed beyond competition. The lesson afforded by indigo should be applied to the case of tannin. Prof. Wilkinson considers that the prime mover in research must be the State, and submits a comprehensive scheme for its inception and organisation.

OUR ASTRONOMICAL COLUMN.

COMET 1916*b* (WOLF).—The following ephemeris of this comet, for Greenwich midnight, is given by Dr. Berberich in *Astronomische Nachrichten*, No. 4870:—

		R.A.			Decl.		Log Δ	Brightness
		h.	m.	s.	°	′		
Feb. 2	...	17	9	0	−5	1·4	0·4406	10·5
10	...		26	5	4	19·9	0·4182	12·3
18	...	17	43	36	3	27·0	0·3951	14·5
26	...	18	1	31	2	22·1	0·3716	17·0
Mar. 6	...		19	48	−1	5·3	0·3476	20·1
14	...		38	26	+0	23·5	0·3235	23·8
22	...	18	57	22	2	4·0	0·2995	28·1
30	...	19	16	34	+3	55·1	0·2758	33·1

The brightness is expressed in terms of the brightness at the time of discovery, 1916, April 3. It is probable that the comet will become a naked-eye object during the summer.